Commercial Fisheries Abstracts

a monthly summary of important developments for the fishery industries

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INVESTIGATIONS

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Vol. 6 No. 6 June 1953

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U.S. Department of the Interior
Washington D.C.

UNITED STATES
DEPARTMENT OF THE INTERIOR

DOUGLAS McKAY, Secretary

FISH AND WILDLIFE SERVICE

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Commercial Fisheries Abstracts

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The abstracts in this leaflet may be left in their present form; but it is suggested that to make the most efficient use of them, they be cut out on the lines designated and filed by the number in the upper left-hand corner of each. For a full description of this filing system see "Fishery Technological Abstract Card System" by Maurice E. Stansby and K. L. Osterhaug, Fishery Leaflet No. 232, obtainable free by request from Fish and Wildlife Service, Washington 25, D. C.

In addition to the regular abstracts, there is included a bibliography of references of secondary importance (without abstracts). These may be cut off on the lines designated and pasted on standard 3 x 5-inch cards for filing.

Following is a brief outline of this filing system. The numbers apply to the first digit appearing on each card. For the meaning of subsequent digits, please see the above described leaflet.

0 General and theoretical
1 Fish by species
2 Fresh fish
3 Preserved fish
4 Oils
5 Vitamins
6 Fishery by-products
7 Analytical Methods
8 Composition
9 Miscellaneous

Issued with the approval of the Bureau of the Budget, December 29, 1950

0.12 WASHING DIRTY FISH BOXES

Anonymous
Food Manufacture XXVIII, No. 3, 116 (March, 1953)

Granton, Scotland is the home of the first mechanized washer to be used in the washing of fish boxes in all of Scotland. This machine is an adaptation of a bottle washer to the washing of boxes.

The new washer is housed in a separate building that accommodates both the machine and a quantity of boxes. Dirty boxes are fed by a single operator into the mouth of the machine. During their journey through the washer the boxes are subjected to a prerinse, detergent, and very hot spray and emerge thoroughly cleaned.

When the boxes emerge they are checked by a second operator at the delivery end for defects (photo this card, over). Clean whole boxes are placed on a gravity roller conveyor and carried to the loading bank level. Low-level loading platforms that can be moved by lift trucks are used for moving boxes to and from the machine and into a storage yard.

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COMMERCIAL FISHERIES ABSTRACTS VOL. VI NO. 6 PAGE 1
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE. ABSTRACTER: Martin Heerdt

2.06 FISH FLOUR AS MILK SUBSTITUTE

Anonymous
U. S. Department of the Interior, Fish and Wildlife Service, Fishery Products Report No. 64, Seattle, Washington (April 2, 1953)

A quart bottle of fish flour--suggested as a possible substitute for a quart of milk in countries where cows are scarce--was exhibited in New York to the 26-nation Executive Board of the United Nations International Children's Emergency Fund on March 20. The sample was called, by representatives of UNICEF and the Food and Agriculture Organization, a deodorized, tasteless product rich in calcium, containing twice as much protein as skim milk, and costing about the same as milk.

To test the public response to fish flour, FAO hopes to conduct tests in Chile later this year, the Board was informed. As a country with a steady supply of fish, Chile would be especially suitable for trials, FAO believes.

The discussion of milk substitutes arose when a report on "Improvement of Child Nutrition" (Doc.E/ICEF/217), drawn up by a technical working group on long-range activities for children, was introduced by a member of the UNICEF staff. The working group, he said, had decided at a recent meeting in Rome that soybean milk and fish flour were the most promising possibilities for milk substitutes. He then described the nutritional value of the products and mentioned the interest expressed by Indonesia, Guatemala, and Chile.

A FAO representative displayed the bottle of fish flour and said the product could be used in biscuits, in soups, or mixed with corn meal. One important advantage, she said,

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COMMERCIAL FISHERIES ABSTRACTS VOL. VI NO. 6 PAGE 1
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE. Reprinted in whole

7.641 RAT GROWTH ASSAY FOR VITAMIN B_{12}. CORRESPONDENCE WITH COLLABORATIVE MICROBIOLOGICAL ASSAY RESULTS ON U.S.P. LIVER EXTRACTS

Frost, Douglas V.; Fricke, Howard H.; and Spruth, Henry C. (Abbott Laboratories, North Chicago, Illinois)
Journal of Nutrition 49, No. 1, 107-120 (January 10, 1953)

For their tests the authors used samples of liver extract that had been used in the U.S.P. collaborative assay in which 26 laboratories participated. The preliminary assays indicated that the rat growth response agreed with microbiological vitamin B_{12} activity.

The assays were conducted by adding test samples to the basal diet for comparison with varying levels of vitamin B_{12} which were also added to the diet. Aliquots of test materials were dried on 50 to 200 grams of powdered dextrin and this was thoroughly blended into weighed amounts of the basal diet. The rats were fed ad libitum and weighed weekly.

There is some evidence that hydroxycobalamin rather than cyanocobalamin is the dominant form of vitamin B_{12} in liver extract. The authors conducted experiments which demonstrated that there is no difference in the rat activity by these crystalline forms of the vitamin.

Tests of the correspondence between rat and microbiological assays furthered the conclusion that both tests measured vitamin B_{12} activity only. The vitamin B_{12}-sparing action of antibiotics was tested. Procaine penicillin and aureomycin exerted a sparing effect for vitamin B_{12} in the rat.

The rat assay was used as a check on methods of destroying vitamin B_{12}. The two methods of destruction used were: (A) 10 U.S.P. units of liver extract containing about

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COMMERCIAL FISHERIES ABSTRACTS VOL. VI NO. 6 PAGE 1
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE. ABSTRACTER: Neva L. Karrick

3.23 TO PREPARE FRIED FISH

Anonymous
Food Engineering 25, No. 3, 182, 184 (March, 1953)

The following method is suggested for producing breaded, deep-fat fried fillets on a small scale:

1. All lateral bones present in the fillets are removed.
2. The fillets are cut into uniform, bite-size pieces weighing about one ounce. Flounder and sole, as well as the tail end of cod and haddock, should be cut into 1/2 by 1 by 1 inch pieces.
3. The small pieces of fish are collected into 25-pound capacity stainless steel trays.
4. The trays are loaded onto racks and stored in a cooler at 32° to 38°F. until ready for breading.

A convenient piece of equipment for breading consists of a 6-compartment stainless steel table on which the battering and breading operations are conducted as follows:

1. The first compartment or supply bin is loaded with 10 pounds of fish.
2. Five pounds of fish from the supply bin are immersed in an all-purpose egg batter usually made from a dry ingredient mix by adding water.
3. The pieces of fish are removed from the batter with the aid of a wire mesh basket and dumped on top of a metal screen.
4. After the pieces of fish have drained, the screen is tilted so that they fall into a compartment which contains the breading mixture for the first breading.

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COMMERCIAL FISHERIES ABSTRACTS VOL. VI NO. 6 PAGE 1
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE. ABSTRACTER: Martin Heerdt

FISH BOX WASHING MACHINE

RAT GROWTH ASSAY FOR VITAMIN B_{12}

FISH FLOUR AS MILK SUBSTITUTE

PREPARATION OF BREADED, FRIED FISH

7.641

10 μg vitamin B_{12} per ml. were made to pH 11 to 12 with sodium hydroxide, and heated 1 hour at 100°C. (B) A similar sample was treated twice with 10% (w/v) additions of sodium hydrosulfite at 5°C. Microbiological assay showed 2 to 5% residual B_{12} activity in the samples treated by both methods. The rat growth response was approximately the level shown by microbiological assay. Cup plate assays also showed zones of growth typical for vitamin B_{12}. Desoxyriboside did not give a growth response when fed at a level of 50 mg. per kilogram of diet. The data suggest that destruction of vitamin B_{12} is incomplete under these conditions.

When 0.5 and 1.0 percent nicotinamide were added to the diet, the growth of both control and vitamin B_{12}-deficient animals was depressed. The spread in weight gain between the deficient and supplemented animals was greater at the lower level of nicotinamide.

Materials that were ineffective in stimulating growth above that obtained on the basal diet included: choline, cystine, methionine, folic acid, p-aminobenzoic acid, primary grown and debitterized brewers' yeasts, thymidine, and a concentrate of vitamin B_{13}. 3, 4-dimethyl benzimidazole plus $CoCl_2 \cdot 6H_2O$ gave a small but significant growth stimulation. When iodinated casein was increased from 0.05 to 0.3 percent of the basal diet, the growth-stimulating effect of vitamin B_{12} was diminished or disappeared altogether. Under these conditions 5 to 10 percent levels of liver residue gave increased growth and decreased mortality. However, under conditions of the vitamin B_{12} assay, liver residue did not give greater growth stimulation than was accounted for by its vitamin B_{12} content as determined by microbiological assay.

Rats from different sources were found to respond differently to the assay. The authors also found that equal sex distribution appeared essential. However, where the number of rats per group is less than 10, the use of one sex is important.

Details of the assay and 25 references are given.

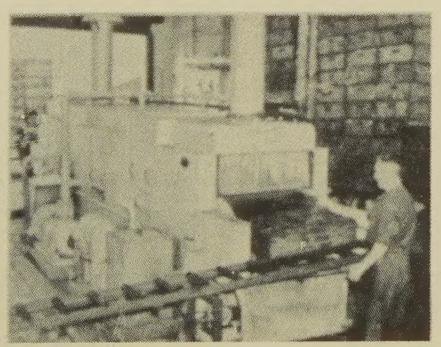
3.23 (Cross Reference: 2.8)

5. To assure complete coverage, the partially-breaded fish are provided with additional breading in an adjacent compartment and made ready for frying.

The frying operation makes use of two batch, deep-fat fryers and a number of trays that can be placed into racks. The procedure is as follows:

1. The breaded pieces of fish are loaded, 12 pounds to a tray, and the full trays are placed in a rack.
2. When one rack has been filled it is rolled onto a foot-operated carriage that immerses it into a vat of 375°F. frying fat for 1 1/2 to 2 minutes.
3. Upon removal from the frying bath the racks of trays containing fried fish are rolled onto an inclined surface and drained for 2 minutes before being placed in a cabinet cooler.
4. When cold the pieces of fish are packed into 12-ounce-size greaseproof cartons, checked-weighed, and frozen.
5. After removal from the freezer the cartons are overwrapped.

0.12 (Cross Reference: 2.41)



At the delivery end, an operator examines the washed fish boxes and places them on the gravity roller conveyor.

2.06

was that fish flour contains vitamin B_{12}, essential for growth, which does not appear in the vegetable diets common in some countries. FAO, she said, was gathering samples of various types of fish flour and would select the most suitable for acceptability tests in Chile.

3.12 PRESERVATION III

Anonymous
Meldinger S.S.F., No. 1, 3-9 (1951)

A comparison was made of the keeping quality at 17°C. of small summer herring: (1) in formalin brine; (2) sprayed with formalin; (3) in nitrite brine; and (4) sprayed with nitrite solution. The approximate keeping times were 7 days for samples preserved with formalin, and 14 days for samples preserved with nitrite. Since a white substance separated when formalin-treated material was cooled to about 0°C., the effect of temperature on the preservative action of formalin was investigated. Two lots of herring treated with 2 different concentrations of formalin (0.5% and 0.25%, each in 10% of brine) were stored at 3° to 4°C., 9°C., and 13°C.; approximate keeping times were 50 and 20 days, 14 and 8 days, and 6 and 4 days respectively. These differences in keeping time appeared to be due solely to the temperature of storage and to the concentration of formalin. Canadian workers have reported that nitrite is ineffective as a preservative for fish at about pH 7. However, the S.S.F. experiments showed that nitrite was still effective, although less so, at pH 7; at 7° to 8°C., herring in brine with 0.5% of nitrite kept for 54 days at pH 6.6, 45 days at pH 7.0, and 100 days at pH 7.2. In experiments in which summer herring were: sprinkled with coarse salt; or sprayed with formalin, nitrite, or formalin + nitrite; or sprinkled with nitrite; or kept in formalin brine or nitrite brine; or put into formalin brine and drained after 2 days, formalin and nitrite were found to be equally effective, but preservation in brine was distinctly better than by spraying. A warning is given with regard to the toxicity of these preservatives.

(The above article appears in Food Science Abstracts 25, No. 1, 18, January, 1953 and is reprinted here)

3.230 THE FREEZING OF FOODSTUFFS

Jul, Mogens
Saertryk af "Ingenioren" nr. 79, 85, 1944. Og. nr. 3, 11, 16, 1945, Copenhagen, Denmark

Only the topic headings have been translated. These are as follows:

1. The significance of freezing for the food supply of the future.
   a. Freezing questions of present interest.
   b. The suitability of various foods for freezing.
   c. Possibilities for freezing foods in the future.
   d. Canned versus frozen foods.
2. A summary of freezing technique.
   a. The principal systems of freezing.
   b. The principles of the different freezing methods.
   c. Freezing by means of evaporation.
   d. Methods of contact freezing.
   e. Methods of air freezing.
   f. Liquid freezing methods (brine).
   g. Polyphase freezing.
   h. The spread of the various freezing methods.
   i. The preservation of frozen foods.
   j. Packaging of frozen foods.
   k. Transportation of frozen foods.
   l. Preservation of frozen foods by the dealer.

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 TRANSLATOR: Kathryn L. Osterhaug

3.231 BLOWER COIL DESIGN AND SELECTION FOR PROPER HUMIDITY CONTROL

Wile, D. D. (Refrigerating Engineering, Inc., Los Angeles, California)
Ice and Refrigeration 124, No. 4, 37-40 (April, 1953)

The relative humidity within a refrigerated room is dependent upon a balance between the rate of removal of moisture and the rate of supply within the space. Condensation or frost accumulations on cooling surfaces indicate that moisture has been removed from the air. Moisture may be supplied to a room by evaporation from the exposed surfaces of a moist product, by the leakage of humid air from the surrounding space, and, possibly by rehumidification with water or steam sprays. Disappointment may result with rooms designed for the storage of unwrapped products when they are only partially loaded because dehydration will be greater as a result of the small amount of moist surface available. Rooms containing products in sealed containers usually function at a low humidity for lack of a source of moisture.

The design of a cooling coil determines the rate of moisture removal and therefore the humidity of any particular application. Coil performance is usually considered in terms of temperature difference between room air and refrigerant. When bare pipe is used, the external surface temperature is usually thought of as the refrigerant temperature; whereas, with a finned coil the coil surface temperature is usually somewhat above the refrigerant temperature. The amount of heat transferred from the air to the coil depends upon the rate of travel of the air and its temperature change. A properly designed coil operating at a 10°F. temperature differential between the air temperature and the refrigerant evaporation temperature will lower the room air by approximately 7°F. provided there is a minimum air movement of 1200 c.f.m.

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 ABSTRACTER: Martin Heerdt

3.230 WHAT'S NEW IN FROZEN FOODS

Tressler, Donald K. (Quartermaster Food and Container Institute for the Armed Forces, Chicago)
Journal of the American Dietetic Association 29, No. 3, 230-233 (March, 1953)

The commercial freezing of precooked foods has advanced steadily since 1940 and today is an important factor in the frozen food business. Included in the large selection of items now available are the following seafood dishes: New England clam chowder, codfish cakes, creamed tuna, halibut cutlets, creamed salmon, salmon loaf, salmon steaks, shrimp a la king, whole shrimp, shrimp sandwich spread, and seafoods a la king.

The advantages of precooked frozen foods to the homemaker include the elimination of much preparation labor and time and the elimination of much waste of material. Precooked frozen foods are convenient because of being immediately available and are particularly useful in the event of unexpected guests or when the homemaker is sick or away from home.

The use of precooked frozen foods is growing commercially. A cafeteria chain in England now has central kitchens that are used as food preparation factories where a large part of the food served in the widely separated units is prepared and frozen. In this country two chains and two railroad dining car services have inaugurated this practice. Some of the advantages that may be enjoyed by these commercial establishments from using precooked frozen food are as follows:

The exact cost of each item can be predicted and controlled. Production costs can be reduced through the use of factory production methods. The amount of kitchen equipment required in the individual restaurants is reduced and less labor is required. These foods are particularly convenient for short-order service.

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 ABSTRACTER: Kathryn L. Osterhaug

PRESERVATION OF FRESH HERRING

HUMIDITY CONTROL IN FROZEN STORAGE

FREEZING OF FOOD PRODUCTS

PROCESSED FROZEN SEAFOODS

3.231

Coil performance can be represented on a simplified psychrometric chart (figure 2, below). Air entering the coil is shown by point A, the surface temperature of the coil by point C on the saturation curve, and the air leaving the coil by point B on the line AC. The temperature change in the air is shown by the length of line BD and the amount of moisture removed by length AD. If a new coil having less surface area is substituted and it is assumed that the refrigeration load and rate of air flow through the cooling unit remain constant, then the same load can be handled only by reducing the surface temperature to point E on the chart. Air will leave the unit at the same temperature (points F and B on the same temperature line), but the moisture content of the air at point G will be much less than with the original coil.

Carrying the same cooling load with less coil surface causes the removal of more moisture and results in lower humidity. With water defrosting, large surface areas can be built into compact and efficient blower units. A finned coil, water defrost unit can produce the same cooling effect and humidity level as one having seven times the volume of bare coil.

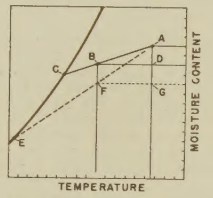

Fig. 2—This simplified psychrometric chart demonstrates that low surface temperatures cause excessive removal of moisture.

3.230

The use of complete meals, assembled on a tray and frozen, was found practical aboard military airplanes during World War II, and some civilian airlines have taken up the idea. The meals are thawed and heated in special electric ovens installed aboard the planes. Menu combinations developed through experimentation include the interesting ones listed below:

Breakfasts

Glazed apples	Spanish omelette
French toast	Fried ham
Canadian-style bacon	Sweet roll

Dinners

Roast turkey	Tenderloin steak and gravy
Dressing and gravy	Potatoes parisienne
Buttered peas	Succotash
Candied sweet potatoes	
Veal goulash	Pot roast of beef
Green beans	Mexican corn
Spanish rice	Potato puffs

In addition to problems posed by individual foods and food preparations, cooked foods present special problems in packaging and in bacterial control. Packages must be air tight, moisture-vapor-proof and heat resistant. Cooked foods must be prepared and packaged under extremely sanitary conditions. They present the special problem of having to be cooled before being frozen. The producer must decide whether to cool before or after packaging.

The Fish and Wildlife Service has demonstrated that an excellent quality of frozen fish may be obtained by freezing the round fish immediately after capture, holding at 0°F. until landed and then thawing and filleting as soon as possible after the fish are ashore. Storage quality of these fillets has proved better than that obtained by freezing fillets from iced fish.

3.12 (Cross Reference: 1.2)

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m. Thawing of frozen foods.
n. Developments during the war.

3. Theoretical investigations of the effect of freezing on foodstuffs.

a. Bursting of tissues caused by strain.
b. The size of crystals and rate of freezing.
c. Explanation of the small size crystals.
d. The freezing processes "reversibility".
e. Determination of amount of drip.
f. The relationship of crystal size and quality of frozen foods.
g. The importance of speed of freezing.
h. Crystal growth and storage time.
i. Theory of constant freezing speed.
j. Methods for investigation of structure in frozen tissue.
k. Sub-freezing of tissue.
l. The effect of freezing on living tissue.
m. Closing remarks.

7.51 MYOGLOBIN FROM CARP MUSCLE

Hamoir, G. (Laboratory of General Biology, University, Liege)
Nature 171, No. 4347, 345-346 (February 21, 1953)

No clear evidence has ever been presented for the occurrence of myoglobin in fish muscle. A red muscular region composed of cells rich in sarcoplasm is present beneath the skin, however, in many teleost fish. The width of the red region is greatest at the level of the lateral line and decreases progressively dorsally and ventrally.

In these experiments the muscles from the lateral red bands of a carp (Cyprinus carpio) were removed and kept frozen at -20°C. After cutting the muscles into slices 40 microns in thickness in an automatic freezing microtome, they were extracted twice for 1 hour in the cold with 1 volume of water. The turbid, reddish solution extracted was easily clarified by dialysis against water and centrifugation, and a clear cherry-red solution containing all of the colored material in the extract was obtained. Electrophoretic analysis of this solution revealed a red color migration as a single peak with a mobility of -2.5 (± 0.05) x 10^{-5} $cm.^2/V./sec.$ at ionic strength 0.15 (0.1 sodium phosphate and 0.05 sodium chloride) and pH 7.3.

Identification of the solution obtained as a solution of myoglobin has been confirmed by the use of Theorell's isolation method. Fish myogen and globulin X were removed at 30° C. from the turbid extract previously mentioned by the addition of 0.15 vol. of M/2 basic lead acetate. The excess of lead was removed by solid tertiary phosphate, while the pH was kept at all times between 7 and 8 by the addition of N sodium hydroxide or N acetic acid. To increase the ionic strength a saturated solution of ammonium sulfate was added until 75 percent saturation was reached. The amount of colored material that can be

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 ABSTRACTER: Martin Heerdt

7.611 SPECTROSCOPIC PROPERTIES OF VITAMIN A_2

Cama, H. R. and Morton, R. A. (University of Liverpool)
Analyst 78, No. 923, 74-79 (February, 1953)

Vitamin A_2, reacted with the Carr-Price, reagent, antimony trichloride in chloroform, produces a bluish color with an absorption band near 693 mmu. In the low potency oils in which the concentration of vitamin A_1 predominates over that of vitamin A_2, the 693 mmu. band can be seen only when the unsaponifiable fraction is used, for the color test is inhibited by certain constituents in the whole oil.

The ultraviolet absorption curves for most liver oils are determined primarily by their vitamin A_1 content, but the curves will be distorted by any vitamin A_2 that may be present. The curves are also modified by the absorption from substances either unrelated to the vitamins A or derived from them by oxidation. It is of practical importance for the analyst to be able to determine the content of vitamin A_2; for by substracting the absorption of the vitamin A_2 from the observed curve, it is possible to assess the extent to which the residual absorption curve is distorted by adventitious interfering substances.

At present, the analyst is handicapped by a lack of precise information that would enable him to calculate the ultraviolet absorption of vitamin A_2 from the color test measurements at 693 mmu.

Vitamin A_2 has not been isolated as a pure crystalline substance, and the best preparations hitherto obtained have been inadequately characterized. However, retinene$_2$, the aldehyde of vitamin A_2, has been obtained in apparently pure crystalline form. Vitamin A_2, made by reducing retinene$_2$ with lithium aluminum hydride, shows a main absorption maximum

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 ABSTRACTER: F. Bruce Sanford

6.134 EVAPORATION OF STICKWATER IN A HEAT EXCHANGER

Anonymous
Meldinger S.S.F., No. 5, 7-10 (1950)

Experiments were carried out in February and April, 1950, using a De Laval 2-phase evaporator, made entirely of stainless steel, with an evaporating capacity of 50 to 80 kg of water per hour; this was adapted with a plate apparatus (8 to 10 plates) as a heat exchanger in 2 sections. Results showed that fish solubles can be produced commercially with apparatus constructed on this principle. Stickwater can be concentrated (to about 50% fish solubles) by evaporation at about 75°C., without difficulties caused by high viscosity and caking. A temperature of about 90°C. in the first phase was advantageous, as also was application of the countercurrent principle. No great differences were observed between ordinary and acidified stickwater. No caking occurred, but some concentrate remained between the plates; this could easily be removed. No undue formation of scum occurred.

(The above article appears in Food Science Abstracts 25, No. 1, 19 January, 1953 and is reprinted here)

6.230 ATLANTIC COD LIVER OIL

Vandenheuvel, F. A. (Atlantic Fisheries Experimental Station)
Trade News 5, No. 4, 3-4 (October, 1952); No. 5, 6-7, 10 (November, 1952); and No. 6, 6-7 (December, 1952)

Cod liver oil contains not only vitamin A but also vitamin D in appreciable amounts. The essential fatty acids of the oil plus the nutritional value of its vitamins explains the sizeable sales of cod liver oil to the feed industry. One hundred years ago the standards for medicinal oil were so low that only a justified faith in its curative properties could explain why the brownish, smelly, repulsive stuff was used at all. In 1848, Charles Fox, at his factory in St. John's, Newfoundland, applied a new principle of rendering fresh livers by heat in a minimum of time. Heretofore the slow rotting process had been used entirely for rendering.

About 1921 the higher potency of cod liver oils from the Maritime provinces was revealed, and a new interest in cod liver oils was aroused. Newfoundland is particularly suited to the manufacture of medicinal oils because of its proximity to the fishing grounds and a good supply of fresh livers. Since the end of World War II the demand for vitamin feeding oils has increased and offered a steadying influence to an industry that had anticipated a return to peace-time production levels.

Cod liver oil may range from 15 to 65 percent of the weight of the liver depending upon a number of factors, such as age of the fish, time of year, and the food on which the fish has been feeding. Cod taken inshore usually have a fat, whitish, very soft liver, whereas cod taken at sea have lean livers ranging in color from pink to red. Lean livers are more difficult to render. Inshore catches with their fat livers are used by the Newfoundland fisheries to produce an oil averaging around 1200 I.U./gram, whereas the lean

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 ABSTRACTER: Martin Heerdt

6.230 (Cross Reference: 1.5)

high seas livers rendered in Nova Scotia and Gaspé produce an oil averaging 3000 I.U./gram. The average vitamin D content of Maritime cod liver oil is 120 I.U./gram. Vitamins A and D are oil-soluble and accompany the oil when the latter is separated from the meat-like substrate. The value of the meat-like residue that remains depends primarily on plex its fragile water-soluble vitamin B complex content.

Of the rapid methods of rendering put into use 100 years ago, the Norwegian steam process was the most efficient. Rapid heating is accomplished by injecting live steam into the finely-ground liver material and removing the oil that comes to the top. Present day use of centrifuges together with an excess of hot water has improved the oil yield from live-steamed livers considerably. The residue that remains, however, is so diluted that drying becomes very expensive in spite of the unaltered vitamin content. Alkali digestion of the livers prior to steaming gives an even better yield of oil, but the vitamin content of the remaining residue is almost nil.

In a new extraction process developed by the Atlantic Fisheries Experimental Station, a small amount of reagent is added to the finely-ground livers along with rapid mixing so as to bring the pH to about 8. The foregoing treatment breaks the stable emulsion of oil in aqueous medium and allows the oil droplets to coalesce for easy separation by the use of the centrifuge. When the reagent treatment is effected above an over-all critical temperature or 153°F. (67°C.) and the material is subsequently cooled, the emulsion breaks very rapidly. The actual critical temperature, however, depends upon the particular type of liver material. Treatment can be effected in a very small apparatus on a continuous basis.

Oil is obtained in 95 percent yield. The residue or paste that remains contains 70 percent water, is easily drum dried, and yields a high-vitamin meal. In terms of B vitamins, the dried meal contains 2.7 mg. of B_1, 18 mg. of B_2, 50 mg. of niacin, 18 mg. of pantothenic acid, and 1.4 mg. of total animal protein factor activity per pound of meal.

7.51

removed at this salt concentration is small. Solid ammonium sulfate was then added, until 95 percent saturation was reached. The red precipitate obtained was dissolved in water and dialyzed against the buffer of ionic strength 0.15 and pH 7.3 previously mentioned. Electrophoretic analysis of these preparations revealed the presence of two gradients. The gradient that was the more color-fast of the two represented about 30 percent of the total protein concentration. In a preliminary examination of the visible spectra of these preparations three maxima of absorption were recorded; a very pronounced one at 415 mμ and two much smaller ones at 540 and 575 mμ. These findings agree with the absorption maxima for myoglobin as reported by Theorell and others.

7.611

near 351 mmu. (E 1%, 1 cm. - about 1400) and a secondary absorption maximum near 287 mmu. (E 1%, 1 cm. - about 750). The blue solution formed with the antimony trichloride reagent shows a maximum at 693 mmu. (E 1%, 1 cm. - about 3900).

The authors give the intensities of the absorption expressed as fractions of E_{max}. for vitamin A_2 alcohol in cyclohexane, isopropanol, ethanol, and petroleum ether for wavelengths from 250 to 420 mmu.

They took the biological potency of vitamin A_2 to be 1.33×10^6 I.U.; and that for vitamin A_1, 3.33×10^6 I.U. per gram.

Fish liver oils, in general, contain much more vitamin A_1 than vitamin A_2, depending upon the species of fish from which the oil was derived. In certain cod liver oils, vitamin A_2 may comprise one-seventh of the total number of vitamin A molecules.

By the determination of the E values of the unsaponifiable fraction at 693 mmu. and 620 mmu. in the antimony trichloride test and at 326 mmu., 351 mmu., and 286 mmu. in the ultraviolet test, the amounts of each of the two vitamins can be measured. The 693 mmu. absorption measures the amount of vitamin A_2 directly; and from this figure, the vitamin A_2 absorption in the ultraviolet can be calculated.

The authors give a conversion factor for calculating the probable vitamin A_2 contribution to the potency. A typical cod liver oil, corrected for irrelevent absorption, gave an estimated vitamin A potency about 6.5 percent lower than the estimate that included the possible contribution from the vitamin A_2.

2.2 SHELL-FISH FOR HUMAN CONSUMPTION, PART I

Dewberry, Elliot B.
Food Manufacture 28, No. 3, 89-93, 108 (March 1, 1953)

Shell-fish can cause illness or "poisoning" due to three general causes. Some people are allergic to one or more species of shell-fish and cannot eat them in even small amounts without exhibiting disagreeable symptoms. Shell-fish from contaminated beds can cause illness and some shell-fish can become poisonous due to the ingestion of feed containing an alkaloid.

During 1915, a series of experiments was carried out at the Fisheries Experimental Station, Conway, Caernarvonshire under the direction of Dr. Dodgson, to develop a reliable treatment for the purification of mussels. The system adopted was based on the natural action of the bivalves clearing their alimentary canals in clean chlorinated seawater for a period of 48 hours. A preliminary hosing down was used to clean the outside of the shells. Bacteriological examination of samples after treatment indicated that the mussels rid themselves of all harmful organisms and of any particles of solid matter, thus making them safe for human consumption.

Later experiments proved that it is possible to treat oysters in the same way. It was found necessary, however, to modify the procedure slightly in order to adequately clean the shells. It was also found necessary to raise the water temperature to 56°F. from October to March.

Any effective remedy for pollution must meet certain requirements:

1. It must be an effective safeguard of the public health by eliminating any risk of illness or poisoning.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

2.08 RESEARCH ON ICING FISH

Taylor, Francis
Southern Fisherman 13, 1953 Yearbook, 94 (March 31, 1953)

A research project was conducted by a Florida fish company to determine what, if any, chemicals could be added to ice to lengthen the storage period of fish. It was concluded that a frozen salt solution could materially improve storage conditions of fish without incurring any problems with regard to its possible detrimental effect on the fish or on the consumer.

The first problem was to find a method of freezing a salt solution uniformly, since under ordinary methods of freezing, salt will separate out of solution. This problem was overcome by the development of a special ice-making machine.

A number of experiments were conducted comparing crushed fresh water ice with crushed salt ice. Crushed fresh water ice was found to melt at approximately 32 degrees, while the temperature of the meat of fish so iced varied anywhere from 36 to 40 degrees. It was also noted that fresh water ice had a tendency to cake and melt away from the fish that were being refrigerated.

Salt ice, prepared from a 3 percent solution of salt water showed no tendency to cake but remained quite slippery; its melting temperature was approximately 28 degrees. The temperature of the salt-iced fish was approximately 31 degrees and because of the salt, there was very little tendency for the formation of slime over a period of time.

Research on this project is continuing.

 ABSTRACTER: Roy C. Stevens

2.01 CHEMICAL STUDY ON PUTREFACTION OF FISH MUSCLE. I. DECOMPOSITION PRODUCTS OF FISH MUSCLE UNDER AEROBIC CONDITIONS

Higashi, H.; Okada, M.; and Yamada, J.
Bulletin of the Japanese Society of Scientific Fisheries 16, 447-453 (1951)
(English summary)

In cod muscle which had putrefied under aerobic conditions at 30°C. for 12 to 14 days, 33% of the original nitrogen remained insoluble (mainly as protein), 49% was found as volatile base, and 5% as soluble non-volatile nitrogen. The volatile acids produced included acetic, propionic, butyric, and valeric acids. Under anaerobic conditions, the final pH was lower (pH 6.8, compared with pH 7.6 under aerobic conditions).

 (The above article appears in Food Science Abstracts 24, No. 5, 425, September, 1952 and is reprinted here)

2.01 BACTERIOLOGICAL INVESTIGATION OF A CASE OF RED DISCOLORATION IN DUTCH SALTED SUMMER HERRING

Luijpen, A. F. M. G.; Mossel, D. A. A.; and Van Den Broek, C. J. H.
Centraal Instituut voor Voedingsonderzoek T.N.O., Utrecht, Publicatie No. 152
Antonie Van Leeuwenhoek 19, 78 (1953)

Herring caught by drift nets and salted immediately, when landed in the Netherlands occasionally show a characteristic red discoloration. The brine has a distinct reddish tinge and the parts of the herring gonads directly exposed to the brine are deep red on the surface. The color may spread continuously over the entire intestines and lining of the body cavity, yet the usual signs of spoilage are not present. When exposed to the air the red color disappears within a few hours, leaving a slight purplish tinge. The red discoloration of herring in brine apparently does not have anything in common with the discoloration caused by the growth of red halophilic bacteria usually found on dry salted fish.

With the appearance of a new instance of red discoloration in brined herring, during September 1951, a systematic bacteriological investigation was made. For isolation of the halophilic bacteria from crushed gonadic tissue and surrounding brine a fish-milk medium containing 10, 16, and 23 percent by weight of sodium chloride was used (See table 1, this card, over, for composition of the standard medium). Incubation was carried out at 37°, 30°, 24°, and 15°C. under both aerobic and anaerobic conditions.

After 1 month of incubation only the brines and tissues cultured aerobically on 23 percent by weight NaCl-medium at 37°C. developed red halophilic bacteria. Colonies appeared as colorless wet spots after 18 days of incubation and turned pink on about the 24th day. Microscopic examination of the colonies indicated the presence of sarcinae. After

(over)

 ABSTRACTER: Martin Heerdt

TREATMENT OF SHELL-FISH FOR HUMAN CONSUMPTION

PUTREFACTIVE DECOMPOSITION PRODUCTS

SALT-WATER ICE

RED DISCOLORATION IN SALTED HERRING

2.01 (Cross Reference: 3.5)

2 months of incubation the brines and tissues cultured aerobically on 23 percent by weight NaCl-medium at 30° and 24°C. also showed some growth of red strains. Even after 6 months of incubation, however, growth of red halophiles did not occur on 23 percent by weight NaCl-medium incubated at 15°C. or on media containing 10 and 16 percent by weight NaCl and incubated at either 37°, 30°, 24°, or 15°C.

Red bacteria were also found in equal number in the tissues and brine from brined herring that appeared to be normal in all respects when these materials were used as controls. The numbers of sarcinae found in the brines approximated 100 per ml. or 10 times the number found in the tissue.

The nature of the factor governing the occurrence of red discoloration was not determined.

TABLE 1

Composition of medium

Tryptone	5 g
Fish solubles (43.7% of solids, 8.1% of NaCl)	6 g
Skim milk[1]	50 ml
Sodium chloride, C.P.	230 g
Agar	15 g
Tap water	694 ml

Sterilization: 15 min/121°C. pH = 6.4

[1]--Added pre-sterilized after sterilization of the basal medium.

2.2 (Cross References: 2.05, 1.80)

2. There should be a means of identifying shell-fish that have been rendered safe.
3. The quality of the shell-fish must not be impaired.
4. The treatment must be simple and certain in action.
5. The treatment must be economically sound so that the cost is related to the value of the shell-fish.

The actual purification routine is as follows:

1. The shell-fish, spread about two-deep on the wooden grids, are thoroughly hosed with a strong jet of water to remove external mud from the shells.
2. The tank is filled with purified sea-water in which the shell-fish remain overnight for the first bath. The impurities which they throw out fall to the floor, and the rapid filtering action of the shell-fish results in the water becoming glass-clear within a few hours.

3. & 4. Steps 1 & 2 are repeated.

5. On the third morning (i.e. after 48 hours), draining of the second bath is followed by a final hosing and flushing to remove ejected matter.
6. The shell-fish are then left covered for one hour in sea-water freshly chlorinated with three parts per million in which they remain closed, to sterilize the outside of the shells.

After treatment the shell-fish are packed in sterilized bags or containers and secured by a lead seal indicating the origin and date of dispatch. This seal guarantees that the contents of the bag have been given a satisfactory treatment at a station approved by the Ministry of Health and under the technical supervision of the Minister of Agriculture and Fisheries.

8.59

THE CHOLESTEROL CONTENT OF MARINE ANIMAL OILS COMMERCIALLY PRODUCED IN NORWAY

Thuesen, Wilhelm
Norsk Avalfangst-Tidende 42, No. 1, 25-29 (January,1953)

The cholesterol content of the most important oils produced by the Norwegian fish oil, whaling, and sealing industries were investigated. Fifty commercially-produced samples were used as experimental material. The halibut and turbot liver oil samples analyzed came from autolyzed livers and had a free fatty acid content ranging from 4.0 to about 16.0 percent (as oleic acid). The other fish liver oils were of good quality with less than 1 percent free fatty acid. The fish body oils and blubber oils from whales and seals also were of good quality with a free fatty acid content ranging between 1 and 3 percent.

Total unsaponifiable matter in the oils was isolated according to the method described in the British Pharmacopoeia 1948. The unsaponifiable fraction obtained was diluted to volume using pure acetone. Duplicate 2-ml. samples of a solution containing a maximum of 1.5 mg. cholesterol were used in estimating cholesterol by the titrimetric precipitation method of Thuesen (1943). The findings appear in table 1 (this card, over).

The total unsaponifiable matter in the oils was found to vary between 0.21 and 40.1 percent, while the cholesterol content varied between 0.05 and 10.4 percent. Of the unsaponifiable matter in sperm whale oil only 0.87 percent was cholesterol; however, in turbot liver oil, 90 percent of the unsaponifiable matter was cholesterol.

Halibut, turbot, and Greenland shark liver oils appeared as the richest sources of cholesterol. Turbot liver oil from extremely autolyzed liver yielded the highest cholesterol value (10.4 percent). In herring oils, both the percentage of unsaponifiable matter and the percentage of cholesterol varied inversely with the fat content of the herring. All of the commercial whale liver oils had been extracted with benzine; they showed a high concentration of cholesterol.

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 ABSTRACTER: Martin Heerdt

6.3

FEEDING OF SEAWEED MEAL TO LACTATING COWS

Dunlop, George (West of Scotland Agricultural College, Auchincruive, Ayr.)
Nature 171, No. 4349, 439-440 (March 7, 1953)

A single addition of copper sulfate to the diet of lactating dairy cows in west Scotland has been shown to increase butterfat production in from one to six days. To determine the effect of feeding foodstuffs rich in trace elements (including copper) on the fat production of cows, a seaweed meal was incorporated in the diet of 17 herds in the same area. The meal consisted of the dried milled seaweed Ascophyllum nodosum. Each cow received 200 grams of the seaweed meal as a replacement for an equal measure of her afternoon production ration. The seaweed meal was thoroughly mixed with the production ration in the feeding trough prior to the arrival of the cows.

Cows that had not calved within the past six months experienced difficulty in eating the entire production ration containing the seaweed meal, and in five of the herds the experiment was terminated within two days. In the remaining 12 herds the meal was fed for a period of 3 to 4 weeks. Daily records of milk production and butterfat content in both the experimental and control cows were kept throughout the feeding period and for a time thereafter. The positive responses obtained in the 12 herds are shown in the accompanying graph (this card, over). At least 6 control and 6 experimental cows were included in each herd. The magnitude of the response varied considerably between cows and between herds. Three of the herds that showed a good response (Brownhill, Greyhill, and Dochorneil) lived on farms having soils deficient in copper, as indicated by the presence of the disease "swayback" in lambs produced there. This disorder may be controlled by the administration of copper sulfate to the ewe immediately before lambing. Statistically, the seaweed meal was shown to have a real effect upon butterfat production; however, the

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 ABSTRACTER: Martin Heerdt

6.130

REPORT FROM THE EXPERIMENTAL PLANT. I. STORAGE AND PRESERVATION, COOKING AND PRESSING, EVAPORATION OF STICKWATER

Anonymous
Meldinger S.S.F., No. 3, 12-17 (1950)

An interim report on some of the work in progress at the A/S Stord herring oil factory, where equipment belonging to the S.S.F. (the Norwegian herring oil and meal industry research institute) was installed. (1) Storage and preservation. Judging by the content of free fatty acids, herring did not appear to be affected by washing before storage; washed herring were at least as easy to press as untreated herring. Salt seemed to be a more effective preservative than formalin. (2) Cooking and pressing. Experiments with a steam cooker, using press liquid as the heat transfer medium, indicated that herring can be cooked by this method without undue formation of deposit. (3) Evaporation of stickwater. Stickwater was produced under various conditions. A small vacuum evaporator with inclined tubes was used, generally at 75°C. Evaporation entailed no technical difficulties; with or without addition of acid, and without previous removal of sludge, there was no formation of deposit. No liberation of oil occurred after addition of acid, and the highest fat content of the stickwater was 0.5%. When 3 samples of stickwater, pH 4.5, 6.3, and 7.5 (i.e. after addition of acid, untreated, and after addition of lye, respectively), were evaporated, viscosity was considerably lower in the sample at pH 7.5; this allowed greater concentration. It was difficult to evaporate the acidified stickwater beyond about 40% solids; evaporation could be continued much further with the unacidified stickwater, but to ensure keeping quality, the product required acidification subsequently.

(The above abstract appears in Food Science Abstracts 25, No. 1, 17, January, 1953 and is reprinted here)

8.64

B VITAMINS IN THE ORGANS OF NORWEGIAN HERRING

Klungsoyr, M. and Boge, G. (Herring Oil and Herring Meal Industry Research Institute, Bergen, Norway)
Meldinger Fra S.S.F., No. 1, 10-13 (January, 1953)

A series of analyses conducted during the large or winter herring season of 1952 shows how riboflavin, niacin, and vitamin B_{12} are divided among the various organs of these fish. Two similar lots of about the same weight containing 20 herring of each sex were selected from a quantity of entirely fresh, sexually mature herring. After weighing, one lot was finely ground, mixed, and a representative sample removed. The other lot was sorted according to sex and each herring was separated into its component parts. The body included the remainder after all of the internal organs had been removed. The viscera included the remainder after the roe or milt and the liver and heart had been removed. The head and gills were separated and analyzed individually. The gills contained most of the blood.

Each of the portions was weighed, ground, and mixed well before sampling for analysis. Vitamin B_{12}, riboflavin, and niacin were determined microbiologically in the aggregate samples. A separate sample of skin- and bone-free fillets from the same lot of herring was also analyzed for the same vitamins. Subsequent methods of extraction based on enzyme digestion showed the riboflavin values to be somewhat low; however, the relative values still remained the same.

Table 1 (omitted) shows that, of the total weight of the herring, the percentages represented by the various portions are as follows: body 70.5, milt 9.0, roe 8.6, viscera 2.1, head 6.3, gills 2.2, liver 1.0, heart 0.2. Table 2 (this card, over) shows the vitamin content of the various portions.

(over)

 ABSTRACTER: Martin Heerdt

8.64

Table II

Material	Vitamin B_{12}			Riboflavin			Niacin		
	µg/g. sample	µg/g. protein	Total mg.	µg/g. sample	µg/g. protein	Total mg.	µg/g. sample	µg/g. protein	Total mg.
Winter herring, whole	0.113	0.63	1.590	2.12	11.8	30.00	44.0	246	620.0
Body	0.094	0.58	0.906	2.70	16.5	26.00	54.0	331	520.0
Milt	0.084	0.34	0.103	0.41	1.7	0.50	26.0	107	32.0
Roe	0.130	0.47	0.152	2.87	10.3	3.40	22.0	79	25.8
Viscera	0.155	0.98	0.044	3.37	21.3	0.95	35.0	220	9.8
Head	0.063	0.49	0.054	0.99	7.7	0.85	18.5	144	15.9
Gills	0.080	0.58	0.024	1.22	8.8	0.37	20.5	149	6.2
Liver	0.337	1.80	0.047	5.85	31.0	0.81	64.5	343	9.0
Heart	0.221	1.22	0.006	7.70	42.5	0.20	63.4	350	1.7
Total	-	-	1.336	-	-	30.08	-	-	620.4
Fillets	0.126	0.72	-	2.71	15.5	-	63.0	360	-

8.59

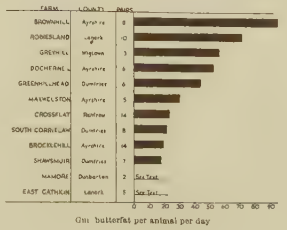
Table 1. Unsaponifiable matter and cholesterol in marine animal oils

	Unsaponifiable matter %	Cholesterol %
Fish liver oils		
Cod, medicinal grade (*Gadus morrhua*)	0.73, 0.80, 0.84, 0.89	0.45, 0.51, 0.56, 0.59
Cod, lower grade	1.00, 1.10	0.57, 0.68
Coalfish (*Gadus virens*)	0.71, 0.82	0.41, 0.50
Halibut (*Hippoglossus hippoglossus*)	9.20, 10.0, 10.7	7.6, 7.6, 7.5
Turbot (*Reinharditus hippoglossoides*)	9.30, 9.56, 11.5	7.7, 8.1, 10.4
Porbeagle (*Lamma cornubica*)	0.79	0.45
Basking shark (*Cetorhinus maximus*)	23.6, 40.1	0.31, 0.47
Dogfish (*Squalus acanthias*)	9.83, 10.7	0.51, 0.72
Greenland shark (*Somniosus microcephalus*)	16.0, 17.2, 20.7	3.62, 3.95, 4.05
Fish body oils		
Large herring (*Clupea harengus*)	0.96, 1.07, 1.13, 1.25	0.59, 0.73, 0.81, 0.92
Small herring, fat (*Clupea hargenus*)	0.63, 0.76, 0.95, 0.79	0.32, 0.36, 0.40, 0.47
Small herring, middle fat	0.87, 1.02, 1.20, 1.43	0.56, 0.67, 0.84, 1.06
Small herring, lean	1.96, 2.24, 3.00, 4.36	1.53, 1.80, 2.48, 3.22
Mackerel (*Scomber scombrus*)	0.79, 1.16, 2.44	0.43, 0.66, 1.34
Rosefish (*Sebastes marinus*)	1.42	0.75
Marine mammalian oils		
Blue whale, liver oil (*Balaenoptera musculus*)	11.4, 13.9, 38.0	8.3, 9.3, 9.1
Blue whale, blubber oil	1.07, 1.18	0.21, 0.22
Sperm whale, head body oil (*Physeter catodon*)	33.4	0.29
Greenland seal, blubber oil (*Phoca groenlandica*)	0.21, 0.28	0.05, 0.10

6.3

magnitude of the effect is not large enough to be detected on most individual farms.

Further experiments are underway to determine if elements other than copper in seaweed meal have an effect upon fat production in the milk of cows.



0.33 RIBOSE AND THE MAILLARD REACTION IN FISH MUSCLE

Tarr, H. L. A. (Pacific Fisheries Experimental Station, Vancouver, B. C.)
Nature 171, No. 4347, 344-345 (February 21, 1953)

When moist fish flesh is exposed to high temperatures, i.e. 120°C., for 1 hour it usually becomes brown in color as a result of reactions of the Maillard type. To determine the relative degree of browning in the heated muscle of white-fleshed fish, a Beckman model DU spectrophotometer equipped with a reflectance accessory was used. A "white" surface produced by blending 4 percent high-viscosity carboxymethylcellulose and 2.5 percent magnesium carbonate with water served as an arbitrary reference standard. Light of 500mμ wave-length was used in making measurements of the percentage of light reflected from the surface of heat-treated fish samples as compared to the reference standard.

The muscle of the marine fish examined initially, often exceeded 1,500 μg of pentose per gram of wet weight. The pentose determined probably was associated with, or derived from, the nucleic acid of fish muscle nucleotropomyosin. In lingcod (Ophiodon elongatus) muscle, the total pentose, as determined by using a trichloracetic acid extract, decreased markedly after heating for 1 hour at 120°C.; an additional 2 hours at 120°C. did not produce any additional loss. Conversely, with halibut (Hippoglossus stenolepis) muscle the measurable loss of total pentose even after 3 hours at 120°C. was very small. When 1,000 μg of D-ribose was added per gram of halibut or lingcod muscle and the muscle was heated, it could not be recovered from the flesh. These findings show that free, rather than combined, pentose was inactivated in the heat-treated flesh. The ribosides guanosine, uridine and adenosine did not cause an increase in the browning of heated muscle as did ribose itself.

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 ABSTRACTER: Martin Heerdt

1.87 LOW COST TANK HOLDS LOBSTERS WEEKS IN ARTIFICIAL SEA WATER

Wilder, D. G.
Maine Coast Fisherman 7, No. 9, 5 (April, 1953)

During recent years the handling and transportation of live lobsters have improved to such an extent that regular shipments are now made regularly to all parts of the country. However, if these markets are to be expanded, inland facilities for holding live lobsters must be improved.

In an effort to solve this problem the Fisheries Research Board of Canada at its Atlantic Biological Station has developed a simple, inexpensive wooden holding unit in which commercial quantities of lobsters have been kept alive and active for several weeks.

The watertight tank is constructed of dressed pine and measures 4 feet square by 8 inches deep (inside dimensions). Five holes, one in the center and one about a foot out from each corner are drilled through the floor of the tank for the air lines. When in use the tank is filled to a depth of 6 inches with 60 gallons of artificial sea water. Although these dimensions may be varied as desired, it is best to avoid large tanks in which lobsters tend to bank in the corners and suffocate. A compressor is equipped with a reducing valve to supply air to the tank at about 10 to 20 pounds pressure.

A 6" x 6" x 6" wooden filter box with 1/4" holes drilled through the bottom is secured above the center air jet and filled to a depth of 3 to 4 inches with five yards of 40" cotton gauze or cheesecloth or with 3 ounces of good quality cotton waste. A 10 1/2" piece of 1 1/4" inside diameter hard rubber tubing is fitted over the air stone, about 1/2"

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 ABSTRACTER: Roy C. Stevens

1.016 REPORT ON THE EGYPTIAN FISHERIES

Hegazi, M.
World Fishing 2, No. 3, 112-113 (March, 1953)

The fisheries of Egypt are generally grouped into three main divisions: the lake fisheries, the inland fisheries and the sea fisheries. All fisheries are the property of the State, and the average total yield is estimated at about 60,000 metric tons.

Approximately 60,000 men and 15,000 boys are permanently employed in the fisheries aside from the multitude of intermediaries, wholesalers, retailers, etc.

The lake fisheries are concentrated in the Delta lakes, the inland lake "Karoon", and the two depressions of Port Fuad and Bardaweel. These lakes are for the most part shallow and therefore easily fished. This fact, coupled with the rapid rate of growth of the fish in them, makes these lakes very productive. The vessels employed in the fishery are generally under 36 feet in length, with a very shallow draft, each carrying a single lateen sail. The gear employed is much the same in all the lakes.

The inland fisheries include the waters of the Nile and its tributaries, and the irrigation and drainage arteries spreading all over the country. The yield of the inland fisheries has been gradually reduced through the construction of dams and canals for irrigation. Vast areas of land that were once inundated for some weeks each year were considered among the best natural nursery grounds for fresh-water fish in the world. The present annual yield is estimated at about 11,000 metric tons.

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 ABSTRACTER: Roy C. Stevens

0.5 MICROBIOLOGICAL EXAMINATION OF SHRIMP

Williams, O. B.
J. Milk Food Tech. 12, 109-110 (1949)

A paper delivered to a Symposium on Food and Milk Sanitation, giving a preliminary report on the natural microbial flora of prawns. In general, the highest counts were obtained on sea water nutrient agar at room temperature; these ranged, in washings of freshly caught prawns, from 3,000 to 100,000 per ml., with a slight increase when the prawns were landed several hours after catching. Heading decreased the count. The wash water collected after washing headed prawns gave counts of several thousand per ml. Bacteria capable of growth at refrigerator temperatures were found in all samples from the Galveston area, but in less than half the samples from the Rockport-Arkansas Pass area. No obligate psychrophilic bacteria were found. There was no correlation between counts at refrigerator and at room temperatures. Relatively low thermophilic counts were noted, and there were no obligate thermophiles. Counts on potato-dextrose agar ranged from 0 to 50 ml., as the prawns were taken from the water. Few anaerobes grew at ice box temperature, but all grew at room temperature. Pseudomonas was absent; Achromobacter spp. were found and were favoured by sea water media; Bacillus spp. were predominantly B. subtilis and B. pumilus; Alcaligenes spp. were fairly common; Proteus spp. were occasionally isolated; and coliform bacteria were irregular, but consisted mostly of Escherichia coli.

(The above abstract appears in Food Science Abstracts 25, No. 1, 23, January, 1953 and is reprinted here)

RIBOSE AND THE MAILLARD REACTION

FISHERIES OF EGYPT

LIVE-TANK FOR LOBSTERS

BACTERIOLOGY OF SHRIMP

1.016

The fishery employs about 18,000 men and 4,000 boys. Approximately 3,140 sailing and rowing boats are used, with an additional 700 boats working on leased areas. Except for limited quantities which are salted in Upper Egypt, the entire yield of the inland fisheries is consumed fresh.

It is proposed that the establishment of fish farms on a large scale in the dry lands surrounding the northern Delta lakes can substantially increase the crop of fresh-water fish.

The sea fisheries are conducted mostly near harbors, bays and inlets, and along the sandy and muddy beaches of the Mediterranean, the Red Sea, and the Suez Canal. An annual yield of over 8,000 metric tons is taken in these fisheries by about 2,000 men in sailing and rowing boats.

There are also 242 motor-driven vessels employed in the fisheries. These range from 40 to 70 feet in length, and from 50 to 200 horsepower. The majority of these vessels use an otter trawl. The annual production of the motor-driven vessels is estimated at 8,000 metric tons. The author states that this can be substantially increased by increased fishing activity and by the adoption of more suitable methods and gear.

0.5 (Cross Reference: 1.85)

0.33

Only small amounts of ribose were found in extracts that had been dried overnight in vacuo over sulfuric acid. Most of the ribose appears, therefore, to combine with free amino groups during the drying period. Satisfactory recovery of ribose was obtained by blending fresh or thawed muscle with 9 volumes of absolute ethanol for 1 minute and concentrating to dryness over sulfuric acid in vacuo. The resulting dry residue was mixed with 1 ml. of water, and the solution applied directly to 28-cm.-wide sheets of Whatman No. 1 filter paper for chromatographic separation of the ribose.

To determine the ribose quantitatively, strips 5 cm. wide were cut across the papers to include all the zones corresponding to D-ribose. Control strips were cut from another area that contained no riboside zones. The strips were eluted with 16 ml. of water, the solutions were filtered through ultra-fine, sintered glass to remove particles of paper, and ribose was determined by Mejbaum's method using duplicate 1-, 2-, and 3-ml. samples. Typical results calculated on the basis of the wet muscle appear in the table below. The quantity of ribose that was recovered from the unheated alcoholic muscle extracts after chromatographic separation corresponds closely with that which disappeared on heating. Thus far, D-ribose has been identified only by the observation of a single spot which develops when mixed lingcod extract and D-ribose are chromatographed together.

FREE RIBOSE IN HALIBUT AND LINGCOD MUSCLE AND ITS RELATION TO THE BROWNING OF THE HEATED MUSCLE (HEATED HALIBUT MUSCLE = 64 PER CENT REFLECTANCE AND HEATED LINGCOD MUSCLE = 36 PER CENT REFLECTANCE AT 500 mμ)

Material chromatographed	Total muscle ribose (γgm./gm.)	Total muscle ribose after heating 1 hr. at 120°C	Loss of ribose due to heating (γgm./gm.)	Ribose recovered after chromatographic separation (γgm.)
Halibut muscle extract (0·16 ml. = 0·48 gm. muscle)	1568 1540	1530 1526		49 31
	1560	1528	32	35·5
Lingcod muscle extract (0·16 ml. = 0·48 gm. muscle)	1456 1406	850 830		585 625
	1433	840	593	555
180 γgm. of D-ribose				188 191
				188·5
80 γgm. of D-ribose plus 133 γgm. (expected) ribose in lingcod muscle extract*				220 (213 expected)

* Calculated from the average ribose content of the lingcod muscle as given in this table

1.87 (Cross Reference: 2.40)

from the floor of the tank, and up through the bottom of the filter box. Water forced up through this tube by compressed air drains back to the tank through the cotton filter. A steady flow of about 20 gallons per hour can be obtained by adjusting the air flow and raising or lowering the rubber hose.

The five salts required are fairly common, inexpensive and generally available. The quantity of each salt required to make up an artificial sea water solution of 60 gallons is as follows: sodium chloride, 14 pounds 2 ounces; magnesium sulfate, 3 pounds 7 1/2 ounces; magnesium chloride, 2 pounds 12 ounces; calcium chloride, 11 1/2 ounces; and potassium chloride, 5 1/2 ounces.

A temperature of 50°F. or lower may be obtained by placing the holding unit in a controlled temperature cool room such as those used for storing unfrozen meat. If the temperature of such a room is too low, the water can be warmed with a stainless steel immersion heater or with partially submerged light bulbs. If such a room is not available, a reasonably suitable temperature can be obtained during the cooler months in an unheated section of a basement. If ice is used to cool the water it must not be allowed to melt into the tank itself as this would reduce the salinity of the water and perhaps kill the lobsters.

2.114 CLAIM WORK BOAT FLEXIBILITY INCREASED BY HYDROJET PROPULSION

Anonymous
Fishing Gazette 70, No. 3, 64, 72, 74 (March, 1953)

The new hydrojet propulsion unit is considered to have many possibilities for commercial work boat operations. Boats equipped with this unit should have substantially increased maneuverability, reduced maintenance problems, and will be able to operate with equal efficiency in deep or shallow waters regardless of debris and without danger of damage to their machinery. In addition, boats so equipped will have good supplies of high or low pressure water available for fire protection and cleaning operations.

In operation, the hydrojet takes water from outside the boat through a sea chest in the bottom of the hull and discharges it as a high-speed jet under the stern. It is this jet of water that propels the boat. Because the only projection below the boat is the jet nozzle, the water depth required for boat operation is said to be reduced by two thirds. All moving parts of the drive mechanism are inside the boat and easily accessible for service and maintenance.

Maneuverability is said to be one of the outstanding features of the new unit. It is claimed that a boat can be turned in its own length even at full speed, every turn being a power turn rather than the drag turn of a propeller-driven craft. A hydrojet-powered boat can be brought to a dead stop in a very short time and without the need of any clutch or reverse gear. It can be run in reverse indefinitely.

It is claimed that the unit will operate satisfactorily in waters of up to 60 percent solids. The screened water intake of the sea chest can be automatically back-flushed by

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 ABSTRACTER: Roy C. Stevens

3.26 MAIL ORDER FISH BUSINESS

Anonymous
Fishing Gazette 70, No. 3, 44-45, 117 (March, 1953)

A Green Bay, Wisconsin company has been in the mail order fish business for 52 years. Placing great emphasis on sanitation and quality, the firm serves more than 50,000 mail order jobbers and customers.

Customers are constantly kept informed of the company's current offerings by printed circular and regular advertising.

Most of the firm's production of frozen fish is shipped in 5- and 10-pound packages wrapped in cellophane and packed in lined cartons in dry ice. The cartons are sealed by a banding machine. All the smoked fish marketed are produced at the plant along with some fillets. However, the company's activities are devoted primarily to marketing rather than processing. Eighty-five percent of their inventories are fresh, frozen products brought in by rail and trucks.

A modern 60- by 110-foot, fireproof, processing, freezing and shipping plant was recently constructed for the company. Contained in this new building are the business office, two private offices, the freezing system, the filleting and smoking rooms, and the warehouse and storage rooms.

The two holding rooms will accommodate over 1,000,000 pounds of frozen fish. More than 15,000 pounds are sharp frozen daily.

 ABSTRACTER: Roy C. Stevens

3.12 PRESERVATION

Anonymous
Meldinger S.S.F., No. 8-9, 3-14 (1950)

Preservatives for herring should prevent spoilage for a considerable time, they should be cheap and non-toxic, and should not cause deterioration in quality of the product. During processing of herring, preservatives may become concentrated in the stickwater or in whole meal and the amount present may exceed the permissible maximum; it may be advantageous, therefore, to use highly volatile materials such as formalin. The keeping quality at about 18° to 20°C. of fresh, untreated, small summer herring was compared with that of similar herring which were: covered with water, 4% nitrite brine, 10% formalin brine, or 15% bisulphite brine; or sprayed with 0.5% formalin; or sprinkled with 5% of coarse salt or "vacuum" (high grade) salt. After 14 days, only the herring which had been covered with nitrite brine or formalin brine were satisfactory; the former deteriorated after 20 to 25 days, but the latter were well-preserved after 43 days. In a second, similar, experiment, the herring were sprinkled with 6% of "vacuum" salt, or covered with 10, 6, 4 or 2% nitrite brine or formalin brine. All the samples were well-preserved after 7 days. After 25 days, only the sample preserved with 10% nitrite or formalin brine or 6% formalin brine were satisfactory; and after 38 days, only those preserved with 10% or 6% formalin brine. Samples preserved with formalin were always better than corresponding samples preserved with nitrite.

(The above abstract appears in Food Science Abstracts 25, No. 1, 17, January, 1953 and is reprinted here)

3.26 A GUIDE FOR THE PROTECTION OF YOUR FROZEN, PACKAGED FISH

Anonymous
Fishing Gazette 70, No. 3, 48-49 (March, 1953)

The weak link in the frozen food quality chain lies in the area of distribution -- what happens after the product leaves the packer. To help the industry find the answer to this problem the National Association of Frozen Food Packers have prepared a special set of rules on "Protecting Frozen Foods from Producer to Consumer."

Packers are reminded that frozen foods must have proper protection in storage: (a) Storage rooms should be 0°F. or colder; (b) Temperatures should be checked daily in all rooms; (c) Products should not be stacked against walls, ceilings, coils, or too close to outside openings. They should not be stacked directly on the floor. Air circulation is important, but products should not be stacked in a draft or constant flow of air; (d) When shipping from storage, cars or carriers capable of holding low temperatures should be chosen; (e) Before loading, the car or trailer should be checked to see that it is clean and free from odor, because some foods easily absorb foreign odors; it should also be precooled; (f) Loading should be done in the minimum possible time. A heavy curtain should be hung over the car or trailer door to keep the cold air inside. The door must be closed immediately when loading is completed. Frozen foods should never be allowed to stand at ordinary temperatures, on loading platforms, in the plant, or anywhere.

The above precautions must also be exercised by distributors of frozen foods. In addition, the following rules should be observed: (a) When transferring the product from storage to the breakup room, the job should be expedited for minimum exposure. (b) In the breakup rooms the products should not be stacked against ceilings, coils, or directly on

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 ABSTRACTER: Roy C. Stevens

HYDROJET PROPULSION

PRESERVATION OF FRESH HERRING

MAIL ORDER FISH BUSINESS

HANDLING FROZEN FISH

3.12 (Cross Reference: 1.2)

3.26

floors. (c) Refrigeration coils should be defrosted or scraped regularly to prevent loss of refrigeration efficiency. (d) Product inventories should be limited to one week's supply. (e) When orders are assembled, each should be clearly marked to indicate the stop number to avoid unnecessary opening of the truck door. (f) Products should be carefully stacked into tiers that will not topple. (g) If a "warm" room (30-40°F.) is used to assemble orders, orders should be assembled promptly and returned to the 0°F. room unless scheduled for immediate delivery.

Delivery trucks should be loaded in the morning -- not the night before deliveries are to be made. Trucks should be precooled before loading. During the summer months enough dry ice should be carried to provide for a carryover until the next loading. Refrigerated trucks should be charged during all non-driving periods. Truck doors must be kept shut as much as possible. A heavy curtain should be installed inside the rear door of the truck.

The following rules apply to the retailer. Frozen foods should never be allowed to stand at room temperature. Cabinets should be kept at 0°F. and the temperature checked every day. Inside walls of the cabinet and refrigeration coils should be kept free of ice and crust snow for efficient cabinet operation. Cabinets should be installed where they will not be disturbed by air circulation. All packages should be rotated weekly, always putting new supplies under the stock already in the cabinet. The cabinet should not be loaded above the frost line. The cabinet should be inspected at least once a day for neat appearance. Packages must never be placed against "hot" walls -- even for display purposes. Walk-in meat coolers should not be used to store frozen foods -- storage for frozen foods should be at 0°F. Frozen foods should never be displayed in unrefrigerated island stalls. Dry ice or refrigerated mobile units should be used. Retailers buying frozen foods on a "cash and carry" basis should take every precaution recommended for wholesale distributors.

2.114

putting the control lever in neutral and gunning the motor. If run aground in shallow waters a hydrojet-powered boat can back off merely by reversing the jet and hydraulically washing away the mud and sand.

The possibilities for the use of this unit in the commercial fisheries are considered to be very great, particularly with small trawlers and gill netters. Because there are no under-water rotating parts the danger of fouling lines or netting is eliminated.

6.190 FISH BY-PRODUCTS

Holder, Ralph C. (National Fisheries Institute)
Flour & Feed 53, No. 11, 24-25 (April, 1953)

Fish meal is a very valuable by-product when used in mixed commercial feeds for animals.

1. Fish meal provides a good source of amino acids.
2. As little as 2 1/2 to 5 percent fish meal in combination with soybean oil meal, cottonseed oil meal, or peanut meal is adequate to improve the utilization efficiency of the total protein in the ration.
3. Fish meal at the 2 1/2 to 5 percent level is a good natural source of the B-complex vitamins including vitamin B_{12}, an important nutrient in the growth and reproduction of animals.
4. Fish meal contains the new factor that has been reported as important in the growth of poultry by the U.S.D.A. at Beltsville, Maryland. This unknown factor is able to increase the rate of growth in chicks even when all of the known nutrients are supplied.
5. Fish meal is a good source of available phosphorus and the trace minerals normally found in the sea.

Condensed fish solubles obtained by concentrating the stickwater that remains after the removal of oil from the press liquor are another valuable by-product of the fish-reduction industry.

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 ABSTRACTER: Martin Heerdt

6.193 MARYLAND POULTRY CONFERENCE

Anonymous
Flour & Feed 53, No. 11, 10 (April, 1953)

In the recent poultry nutrition conference held at the University of Maryland on March 6, 1953, the need for unidentified growth factors in practical type broiler rations was reviewed by G. F. Combs. Evidence was presented to show that at least two different factors are required in many practical rations even though other conditions may modify the need for these nutrients.

Fish meal, fish solubles, crab meal, liver meal, whole solubles and probably certain other products of animal origin supply one of the two factors. The other factor apparently is supplied by dried whey, dried brewers' yeast, dried distillers' solubles, and various products of fermentation. The latter include butyl molasses solubles, ethyl molasses solubles, butyl grain solubles, and condensed grain fermentation solubles. Actually, more than two unidentified factors may be involved in the nutrition of broilers and chicks; therefore, two different sources of the second factor should be used in most broiler and starter mashes. To provide the minimum requirement of the first factor, the ration should contain 2 1/2 to 4 percent of good quality fish meal.

 ABSTRACTER: Martin Heerdt

6.195 EFFECT OF METHIONINE SUPPLEMENTATION AND DIFFERENT PROTEIN LEVELS ON GROWTH AND FEED REQUIREMENTS OF BROILER CHICKENS

Combs, G. F.; Twining, P. F.; and Laurent, C. K.
Southern Fisherman 13, No. 2, 73-75 (February, 1953)

Considerable work has been done to determine the value of methionine supplementation to broiler rations. Although most of the recent experiments show that the addition of methionine to the rations results in an increased monetary return over feed costs, there has been great variation in the experimental data. The differences are difficult to explain.

Recent studies have shown that the methionine requirement of chicks is correlated with the level of protein in their diet. In practical broiler production, the usual practice is to lower the protein level in the diet during the last three or four weeks of the growing period. In view of these facts, the authors conducted a study to determine the effect of feeding rations containing different protein levels, with and without added methionine, to broiler chickens maintained under practical conditions.

The chickens were reared to 10 weeks of age in floor pens. Three rations containing different levels of protein were used. The effect of adding one pound of dl-methionine per ton was tested at each level.

The authors found that the reduction of the protein level from 22.1 percent to 19.2 percent when the broilers were at six weeks of age or from 22.1 to 19.2 when the broilers were at six weeks of age followed by a further reduction to 16.3 percent at eight weeks of age did not retard the rate of growth. However, in reductions in the protein levels in which ground yellow corn replaced a portion of soybean oil meal, the feed efficiency was

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 ABSTRACTER: F. Bruce Sanford

6.190 CHICK FEEDING EXPERIMENTS WITH WHOLE MEAL

Hoie, J.
Meldinger S.S.F., No. 4, 12-19 (1950)

"Whole meal" is ordinary herring meal + stickwater solids. Experiments showed that substitution of ordinary herring meal in concentrated feeds for chicks caused increased growth and decreased mortality; when some of the ordinary herring meal was replaced by stickwater, the same effect was observed. Addition of yeast did not have any effect. Stickwater was also found to contain substances necessary for young chicks. In some experiments, however, the stickwater was found to be of little value; variations in value may be due to the fish from which the stickwater was prepared, to processing conditions, or to subsequent treatment of the stickwater. Some measure of control is required. It is recommended that Norwegian poultry farmers make use of stickwater and whole meal.

 (The above article appears in Food Science Abstracts 25, No. 1, 21, January, 1953 and is reprinted here)

FISH BY-PRODUCTS IN ANIMAL FEEDS

METHIONINE SUPPLEMENTATION IN POULTRY FEEDS

GROWTH FACTORS IN POULTRY RATIONS

NUTRITIVE VALUE OF WHOLE MEAL

6.195 (Cross Reference: 0.7)

less and the feathering was poorer. The addition of 0.05 percent methionine was of little value in this trial.

The relative lack of response obtained with methionine in this study would not justify its use in practical rations. However, considerable variation exists in the results from methionine supplementation, and it has been shown to be of economic value in other trials.

There is a need for more knowledge of the mechanism in the methionine response. The increases in growth and feed efficiency that usually result cannot be readily attributed to the over-all increase in the methionine level of the diet. Rather, the presence of free methionine in the feed appears to be of value only under certain conditions. Added methionine may exert an influence through the action of certain bacteria in the intestinal tract of the chicken. If true, this would explain some of the differences in results that have been obtained under different environmental conditions.

Previous work at Maryland showed that the addition of penicillin greatly increased the response from supplemental methionine. A recent study at Michigan State College showed that, in the presence of an antibiotic, a combination of methionine and orotic acid was effective in replacing an unidentified growth factor present in condensed whey solubles. Either methionine or orotic acid alone was ineffective. Thus, the value of supplemental methionine in broiler rations must depend on factors that, at present, are not completely understood. Consequently, methionine supplementation cannot be expected to exert a beneficial effect under all conditions.

6.190

1. Condensed fish solubles are a source of the B-complex vitamins: a fair source of riboflavin, a good source of pantothenic acid, and an excellent source of niacin, vitamin B_{12}, and the unknown growth factor reported by the U.S.D.A.
2. Rations containing 2 or 3 percent condensed solubles have been proven to be of excellent value for growth and reproduction in poultry and swine.

The animal feed industry is presently using fish by-products in chick starter rations, broiler feeds, poultry breeder mash, calf starters, dog and cat food, swine feeds, and fox and mink feeds. The wide usage of by-products made from fish indicates that the feed industry is confident of their value in animal nutrition.

3.230 FROZEN FISH IN NEW FORM AND TAILORED SIZES

Anonymous
Food Engineering 25, No. 4, 192 (April, 1953)
Canner 116, No. 14, 13-14 (April 4, 1953)

A St. Simons Island, Georgia concern has recently begun to expand its flash-frozen shrimp and shellfish business to include ocean-fresh fish tailored to the user's requirements. The new line of fresh-frozen fish will be prepared in the form of various-sized skinless and boneless unit servings ready for cooking without further preparation or thawing. Processing and freezing will be carried out in a new modern plant at Fortune Bay, Newfoundland. This plant, because of its nearness to the St. Pierre and Grand Banks is ideally located for receiving high quality fresh fish. Approximately 10,000,000 pounds of packaged sole, flounder, ocean perch, salmon, cod, halibut, and haddock will be processed annually for the United States market.

The various product shapes to be marketed include cubes (48 to a pound), sticks (1 ounce size) for quick snacks, rectangles for family servings, squares for sandwiches, round salmon steaks for party meals, and conventional fillets. Large fillets will be cut into portions of the desired size prior to freezing and packaging. Fillets too small to provide a single portion will be lapped to become permanently bonded together during freezing at -60°F. Uniformity in size, shape, and thickness will also contribute to better control in cooking all pieces to the same degree of doneness.

Each product will receive one of three frozen-food, protective coatings that have been formulated for a particular culinary purpose. Some of the fish shapes will be ice-glazed for chowders, stews, and bouillabaisse; others will be breaded for deep-fat frying, pan frying

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 ABSTRACTER: Martin Heerdt

8.7 SICILIAN FISH LIVER OIL

Anonymous
Food Manufacture 28, No. 4, 135 (April, 1953)

The waters of the Ionian Sea near the Strait of Messina abound in a species of medium-sized shark that has been identified as Hexanchus griseus, Raf. This shark is known locally as the cow-fish. For many years liver oil extracted from this shark by crude methods has been known as a medicinal panacea for the healing of wounds, ulcers, varicose veins, suppurations, and skin ailments.

With the idea of finding commercial uses for cow-fish liver oil, F. Monforte and G. Fenech, of the University of Messina, determined a number of its chemical and physical properties. A preliminary report of their findings appeared in Chimica E Industria, June, 1952.

All of the analyses were based on a 6 1/2-pound sample of liver oil. This sample of oil was extracted from the 13-pound liver of a 75-pound cow-fish. The data obtained appear in tabular form below.

OIL ANALYSIS FROM COW-FISH LIVER

Colour	*Fresh oil light yellow*	*Aged oil reddish-brown*
Solidifying point	+ 10° to + 2°C	+ 10° to + 4°C.
Specific gravity at 20°C.	0·9041	0·9214
Refractive index at 22°C	1·4625	1·4635
Rotary power at 20°C	2·4	−3·03
Melting point of fatty acids	29°-32°C.	22°-23°C.
Acidity (% oleic acid)	0	0·78
Iodine value (Hübl)	87·3	62
Saponification value	141	123·7
Acetyl value	96	70
Ester value	141	104·3
% Squalene	0·275	0·035
Vitamin A content (I.U. per g. of oil), mean of many determinations	2123	0

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 ABSTRACTER: Martin Heerdt

6.134 REPORT FROM THE EXPERIMENTAL PLANT. III. EVAPORATION OF STICKWATER IN A SPRAY EVAPORATOR

Anonymous
Meldinger S.S.F., No. 6-7, 3-7 (1950)

A special apparatus was designed for experimental work by the S.S.F. The original equipment consisted of a cyclone 2.5 m in diameter and 3 m in height, constructed of 1.5 mm aluminium plate. The disc in the top rotated at about 6,000 r.p.m. and hot air was supplied directly from an oil burner. Several changes in the equipment were made as the result of experimental observations. It was apparent that the incoming warm air should not be blown directly against the rotating disc, but should be introduced round the whole circumference of the cyclone. It was preferable to have an extra cyclone between the drier and the fan for the exhaust air. Experiments showed that at concentrations up to about 30% solids, the stickwater flowed so easily that it would run down the walls of the drier without accumulating on them. Temperatures of the incoming air were about 425° to 575°C.; of the outlet, about 45° to 65°C. On the basis of this work, a more adequate spray drier was designed; it is described and shown in diagrams.

(The above abstract appears in Food Science Abstracts 25, No. 1, 19, January, 1953 and is reprinted here)

0.7 CONSIDERATIONS ON THE SAFETY OF ARSANILIC ACID FOR USE IN POULTRY FEEDS

Frost, Douglas V. (Abbott Laboratories, North Chicago, Illinois)
Poultry Science 32, No. 2, 217-227 (March, 1953)

The remarkable growth stimulating properties of 3-nitro-4-hydroxyphenylarsonic acid when given to chickens and turkeys in drinking water at sub-coccidiostatic levels was briefly reported upon by Morehouse and Mayfield (1946). Other investigators have indicated that arsanilic acid and sodium arsonate are also effective in stimulating the growth of chickens, turkeys, and hogs.

For many years veterinary medicine has made use of arsenic compounds as tonics to improve the general well-being and appearance of animals. Their tonic action, however, still remains unexplained. Arsanilic acid was first correctly characterized as p-aminophenylarsonic acid by Ehrlich and Bertheim (1907). Chemotherapy as a science began with the finding that sodium arsanilate favorably influenced experimental trypanosomiasis and other infections in animals.

Inorganic arsenic exerts a favorable effect only in very low concentrations. Very little is known about the mechanism by which stimulation occurs, since the essential nature of arsenic in nutrition has not been established. Various responses have been reported in animals and in human beings. Rats, for example, responded to small amounts of sodium arsenate with increases in hemoglobin when put on a ration of skim-milk powder with iron and copper. At low concentrations arsenate may stimulate the rate of glucose fermentation by yeast, the growth and metamorphosis of tadpoles, etc. The increase in arsenic in the blood during menstruation and pregnancy, and in the blood of cancer patients has led to the idea that arsenic stimulates tissue growth and proliferations. Others have reported that arsenic feeding led to the thickening of bones in rabbits, chickens, and pigs and the en-

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 ABSTRACTER: Martin Heerdt

FROZEN FISH IN TAILORED SIZES

SPRAY EVAPORATION OF STICKWATER

SICILIAN SHARK LIVER OIL

ARSANILIC ACID IN POULTRY FEEDS

0.7 (Cross Reference: 8.42)

largement of the thymus in animals in general. Arsanilic acid resembles sulfanilamide in both its chemical and bacteriologic properties in regard to its indirect effect on microflora of the intestinal tract.

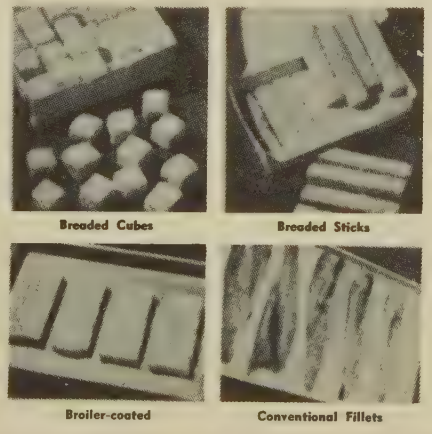
The question of arsenic-fed livestock as a danger to the consumer can best be answered on a comparison basis with other common foods. On a wet basis, 15 species of fresh-water fish averaged 0.75 ppm. As_2O_3; cod, eels, and mackerel, 1.5-4.1 ppm. As_2O_3; and shellfish and crustaceans 3-174 ppm. As_2O_3. Much of the arsenic in fish is found in the fat, and is ether-soluble. Adult humans who consumed 1 mg. of arsenic in shrimp or as As_2O_3 excreted all of it irrespective of the source. Rats, however, retained more arsenic from As_2O_3 than from shrimp.

In studies with arsanilic acid at levels of 90, 180, and 270 grams per ton of feed, arsenic deposition in the liver and muscle was a direct function of the level of arsanilic acid fed. Deposition in the liver was particularly striking. Arsenic disappeared from the tissues quite rapidly when removed from the feed before slaughter. Chicks on the highest levels of arsanilic acid showed the greatest drop, so that little difference in tissue levels remained among the groups 5 days after removal. No pathologic disturbances were observed in any of the groups. A net weight gain of 6-7 percent above the controls was recorded at 10 weeks in the groups receiving the 90-and 180-gram levels of arsanilic acid. The group receiving 270 grams per ton of feed were about on a par with the control group.

Another group of chicks receiving 0.0067 or 0.01 percent arsanilic acid in the diet for 11 weeks showed, respectively, final levels of 1.1 and 1.4 ppm. As_2O_3 in the liver and 0.3 to 0.35 ppm. As_2O_3 in the muscle. Five days after the removal of arsanilic acid from the diet, chicks from both levels showed 0.4 ppm. As_2O_3 in the liver and 0.1-0.2 ppm. in the muscle. By comparison, a sample of salted codfish freshened in running water according to directions contained 1.12 ppm. As_2O_3, while canned salmon, tuna, and sardines contained 0.45, 0.48, and 0.38 ppm. As_2O_3 respectively.

3.230

or sauteeing; and still others will be broiler-coated with a preparation consisting of butter, lemon juice, paprika, parsley essence, and other seasoning to impart a flavor to the fish after broiling. All portions will be flash-frozen individually at -60°F. and then packaged so as to facilitate separation and cooking without thawing.



Breaded Cubes | Breaded Sticks

Broiler-coated | Conventional Fillets

8.7 (Cross Reference: 1.79)

The fresh cow-fish liver oil contained about twice the amount of vitamin A found in cod liver oil (1,000 I.U.). Within a few months, however, this value was halved; and by the end of two years it had dimished to zero. Unfortunately, the storage conditions were not specified in the report. One and one-half hours of hydrogenation at 250°C. in the presence of nickel formate produced a solid fat with a melting point of 43°C.

In summation, the authors report that the ease of refining, vitamin A content, non-drying characteristics, and ease of hydrogenation all combine to make the oil potentially attractive for the manufacture of lubricants, soap, candles, foods, and pharmaceuticals. With modern fishing and processing techniques Ionian cow-fish oil might become the basis of a sizeable local industry.

9.4 FISHERIES RESEARCH CENTER ESTABLISHED IN CUBA

Anonymous
FAO Fisheries Bulletin 5, No. 6, 224-225 (November-December, 1952)

A Fisheries Research Center has recently been established at Playa Habana, on the north coast of Cuba, about 19 miles from the capital. The Center's building is equipped with an aquarium; chemical and biological laboratories; refrigeration, incubating and retorting rooms; a library; offices; and employee's quarters. Outside the building are four live-storage tanks equipped with a continuous pumping system, an oxygen control unit and an emergency auxiliary system. The Center has three small fishing boats and plans to acquire a research vessel.

The present program of the Research Center includes:

(1) A four-year program for investigating the sea fisheries and other fishing areas of the insular shelf, and migratory movements of commercial species.
(2) A study of the life cycle of the Cuban oyster (Ostrea rizophorae) as well as investigations that will lead to the expansion of present areas of exploitation and the use of new areas. Plans have been made to introduce the American oyster (Ostrea virginica) into Cuban waters.
(3) A study of the spawning and migration areas of the lane snapper (L. synagris).
(4) Investigations into the migration and spawning habits of the spiny lobster and the hard-shell crab and into methods of artificial propagation.
(5) Explorations to locate the grounds of the large shrimp of the genus Peneus, especially the pink grooved shrimp.
(6) Studies of the plankton constituting the food of commercial species.

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3.19 ONE-SECOND MEAT PRESERVATION

Anonymous
Chemical and Engineering News 31, No. 14, 1375 (April 6, 1953)

An "assembly line" cathode-ray irradiation process has been developed to preserve meats and some vegetables. The method, developed by MIT scientists working on a Navy contract, will allow meat to be kept 60 days or longer at ordinary refrigeration temperatures. The process, which takes one second, compares with older methods which took at least 24 hours and were not as effective. Loss of flavor or introduction of odors is avoided, the Navy says. The "assembly line" is a 6-foot conveyor belt which passes the meat under cathode rays generated in a 3-million-volt accelerator. The method has been applied to meat, fresh spinach, and nearly ripe tomatoes. Preservation of sterilized meat at room temperatures is a possible future development, although not yet accomplished.

7.81 AMINES IN FISH MUSCLE. I. COLORIMETRIC DETERMINATION OF TRIMETHYLAMINE AS THE PICRATE SALT

Dyer, W. J.
Journal of the Fisheries Research Board of Canada VI, No. 5, 351-358 (October, 1945)

A sensitive colorimetric method for estimating the spoilage of fish by trimethylamine determination has been developed.

Trimethylamine is extracted from the fish by either trichloracetic acid or formaldehyde. The determination also can be applied directly to the pickle from canned fish. The liquid extract containing 0.002 to 0.02 mg. nitrogen as trimethylamine is made alkaline with potassium carbonate in the presence of formaldehyde. The trimethylamine is extracted from the basic solution with a measured volume of toluene. An aliquot of the toluene extract is removed and dried over granular anhydrous sodium sulfate. The dried toluene is transferred to a colorimeter tube and mixed with 0.02 percent picric acid dissolved in moisture-free toluene. After mixing, the yellow color is read in a photoelectric colorimeter using a filter with maximum transmission at 4200 Å units. The blank is made in the same way except that water is used instead of trimethylamine extract.

The addition of formaldehyde before toluene extraction increased the stability of the color solution. Only a slight change of color occurred in one month. Formaldehyde gives a slight color with picric acid but the effect was eliminated by reading against the blank containing formaldehyde.

Ammonia was found to interfere with the determination. Amino acids and other common nitrogeneous compounds in fish muscle were found not to interfere. Lecithin produced a

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2.5 TRANSPORTING LIVE FISH

Anonymous
Modern Refrigeration 56, No. 660, 80 (March, 1953)

A specially-designed, insulated railway car for the transportation of live fish has recently been developed by the French National Railways. The car is fitted with four galvanized metal tanks, each measuring 8 feet 4 inches long, 3 feet 1 inch wide, and 3 feet 8 inches high, and having a capacity of 576 gallons.

The car has an over-all length of 37 feet 2 inches and has a capacity of just under 14 tons. Insulation is provided by a cork mattress held between a double layer of corrugation in the floor, sides and roof, while between the cork and the corrugation is a layer of Ruberoid covered with cardboard. Access to the car is provided by a centrally-placed double door that can be closed from either outside or inside. Each tank is equipped with an outlet valve that can be regulated to work at varying rates, a thermometer and an instrument for measuring water level.

CUBAN FISHERIES RESEARCH CENTER

COLORIMETRIC DETERMINATION OF TRIMETHYLAMINE

CATHODE RAY IRRADIATION

CAR FOR TRANSPORTING LIVE FISH

7.81

cloudy yellow color. The lecithin interference can be removed when necessary by preliminary extraction of the acidified sample solution with a fat solvent.

Results obtained by the colorimetric method were compared with results obtained by both the semi-macro distillation and modified Conway methods of Beatty and Gibbons. The results show good agreement between all three methods.

9.4

(7) Investigations on the diseases of sponges, and the exploration of new areas.
(8) The compilation of fishery statistics: landings, catch per unit of effort, gear employed, personnel and fishing vessels employed, etc.
(9) The study of methods of preservation.
(10) The study of transport and storage facilities.

1.0149 MEDITERRANEAN FISHERIES

Girard, M. J.
FAO Fisheries Bulletin 5, Nos. 3-4, 120 (May/June - July/August, 1952)

1.017 FATS AND NEW ZEALAND'S ECONOMY

Shorland, F. B.
Food Manufacture XXVIII, No. 1, 21-26 (January, 1953)

(Abstract of this article appears under 4.7 page 17 - May, 1953 issue)

1.5 ATLANTIC COD LIVER OIL

Vandenheuvel, F. A.
Trade News 5, No. 4, 3-4 (October, 1952); No. 5, 6-7, 10 (November, 1952); and No. 6, 6-7 (December, 1952)

(Abstract of this article appears under 6.230 page 5)

1.79 SICILIAN FISH LIVER OIL

Anonymous
Food Manufacture 28, No. 4, 135 (April, 1953)

(Abstract of this article appears under 8.7 page 17)

1.80 SHELL-FISH FOR HUMAN CONSUMPTION -- PART I

Dewberry, Elliot B.
Food Manufacture 28, No. 3, 89-93, 108 (March 1, 1953)

(Abstract of this article appears under 2.2 page 7)

1.80 STUDIES ON THE METHOD OF GATHERING SHELL-MEATS FROM SHELL-FISH. PART I. FUNDAMENTAL STUDIES ON THE CHEMICAL SHUCKING -- I.

Miyake, Masato
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 5, 208 (1952)
(English summary, tables and figures)

1.80 STUDIES ON THE METHOD OF GATHERING SHELL-MEATS FROM SHELL-FISH. PART II. FUNDAMENTAL STUDIES ON THE CHEMICAL SHUCKING -- II.

Miyake, Masato
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 5, 213 (1952)
(English summary, tables and figures)

1.81 HISTORY OF THE NORTHERN OYSTER INDUSTRY

Anonymous
Atlantic Fisherman 34, No. 2, 16 (March, 1953)

1.81 THE PACIFIC OYSTER OF BRITISH COLUMBIA

Quayle, D. B. (British Columbia Department of Fisheries, Ladysmith, B. C.)
Trade News 5, No. 8, 3 (February, 1953)

1.85 MICROBIOLOGICAL EXAMINATION OF SHRIMP

Williams, O. B.
Journal of Milk Food Tech. 12, 109-110 (1949)
Food Science Abstracts 25, No. 1, 23 (January, 1953)

(Abstract of this article appears under 0.5 page 11)

2.111 STUDIES ON THE PRESERVATION OF NETTING CORD BY CHLORINATED SUBSTANCE OF COALTAR CONSTITUENTS (PRELIMINARY REPORT)

Honda, Katsuji and Okada, Ikunosuke
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 5, 217 (1952)
(English summary, table and figures)

2.1124 MODEL EXPERIMENTS ON TRAP NET FOR SARDINE AND SQUARE POUND NET FOR HERRING

Inoue, Minoru
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 5, 197 (1952)
(English summary, tables and figures)

2.113 FUMIGATING VESSELS WITH HYDROCYANIC GAS

Wilber, C. D.
Southern Fisherman 13, Yearbook, 140 (March 31, 1953)

2.116 A COMPLETE OUTLINE OF LORAN EQUIPMENT AND ITS OPERATION FOR FISHING BOATS

Anonymous
Fishing Gazette 70, No. 3, 66 (March, 1953)

2.40 LOW COST TANK HOLDS LOBSTERS WEEKS IN ARTIFICIAL SEA WATER

Wilder, D. G.
Maine Coast Fisherman 7, No. 9, 5, (April, 1953)

(Abstract of this article appears under 1.87 page 11)

2.05 SHELL-FISH FOR HUMAN CONSUMPTION -- PART I

Dewberry, Elliot B.
Food Manufacture 28, No. 3, 89-93, 108 (March 1, 1953)

(Abstract of this article appears under 2.2 page 7)

2.41 WASHING DIRTY FISH BOXES

Anonymous
Food Manufacture XXVIII, No. 3, 116 (March, 1953)

(Abstract of this article appears under 0.12 page 1)

2.8 TO PREPARE FRIED FISH

Anonymous
Food Engineering 25, No. 3, 182, 184 (March, 1953)

(Abstract of this article appears under 3.23 page 1)

3.23 NEW BREADING MACHINE

Anonymous
Southern Fisherman 13, Yearbook, 94 (March 31, 1953)

3.230 ANNUAL REPORT FROM THE FISHERY MINISTER'S RESEARCH LABORATORY FOR 1952

Anonymous
Annual Report from the Fishery Minister's Research Laboratory for 1952, Copenhagen (1953), 20 pages, English Summary

(Abstract of this article appears under 3.0 page 3 - May, 1953 issue)

3.230 SEA-FOOD PRODUCTS IN ARMED FORCES RATIONS

Peterson, Stanley R.
Activities Report on Food and Container Research and Development for the Armed Forces, Third Quarter 1952, 4, No. 3, 218-224 (October, 1952)
Commercial Fisheries Review 15, No. 1, 1-7 (January, 1953)

(Abstract of this article appears under 3.30 page 19 - May, 1953 issue)

3.19 EFFECT OF PROCESSING CONDITIONS ON ORGANOLEPTIC CHANGES IN FOODSTUFFS STERILIZED WITH HIGH INTENSITY ELECTRONS

Huber, Wolfgang; Brasch, Arno; and Waly, Adnan (Electronized Chemicals Corporation, Brooklyn, N. Y.)
Food Technology 7, No. 3, 109 (March, 1953)

3.238 APPARATUS FOR MEASURING GAS PERMEABILITY OF SHEET MATERIALS

Brubaker, David W. and Kammermeyer, Karl (Chemical Engr., State U. of Iowa, Iowa City)
Analytical Chemistry 25, No. 3, 424 (March, 1953)

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Peterson, Stanley R.
Activities Report on the Food and Container Research and Development for the Armed Forces, Third Quarter 1952, 4, No. 3, 218-224 (October, 1952)
Commercial Fisheries Review 15, No. 1, 1-7 (January, 1953)

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3.238 PACKAGE HYGROMETERS

Coon, Kenneth C.
Modern Packaging 26, No. 7, 119 (March, 1953)

3.33 STERILIZES CAN SEAMS SEPARATELY TO CUT HOT-HOLDING TIME

Anonymous
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3.33 THE TECHNIQUE OF THE CANNING OF FISH AND CRUSTACEA

Dieuzeide, R. and Novella, M.
Gouvernement General de l'Algerie, Direction de l'Economie, Algerienne, Inspection Generale de l'Agriculture, Documents et Renseignements agricoles, Bull. No. 137, 510 pp., (1948)
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3.33 HEAT PROCESSING OF BEEF. II. DEVELOPMENT OF ISOTHERMAL AND ISOCHRONAL DISTRIBUTIONS DURING HEAT PROCESSING OF BEEF

Hurwicz, H. and Tischer, R. G. (Agricultural Experiment Station, Iowa State College, Ames, Iowa)
Food Research 17, No. 6, 518 (November-December, 1952)

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Canadian Fisherman
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Commercial Fisherman
Drug and Cosmetic Industry
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Feedstuffs
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Food Research
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Journal of Applied Chemistry
Journal of Biological Chemistry
Journal of Home Economics
Journal of Nutrition
Journal of the American Chemical Society
Journal of the American Dietetic Association
Journal of the American Oil Chemists' Society
Journal of the Association of Official Agricultural Chemists
Journal of the Fisheries Research Board of Canada
Journal of the Science of Food and Agriculture
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National Provisioner
Nature
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Oil, Paint and Drug Reporter
Pacific Fisherman
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Report of the Food Investigation Board (Great Britain)
Science
Seafood Business
Southern Fisherman
Trade News (Fisheries Department, Canada)
Western Canner and Packer
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Articles chosen for abstracting or inclusion as bibliographical references are those deemed of interest to the commercial fisheries and to fishery technological laboratories. Occasionally pertinent articles from sources other than the above listed publications are included. Biological papers are generally omitted.

5.125 ACUTE HYPERVITAMINOSIS A IN MAN (POISONING WITH WHALE LIVER)

Poslavskii, E. V. and Bogatkina, Z. G.
Klin, Med. (U.S.S.R.) 26, No. 11, 49-55 (1948)
Abstracts World Med. 6, 55 (1949)
Chemical Abstracts 47, No. 1, 180 (1953)

5.127 EVALUATION OF VITAMIN REQUIREMENT DATA

Almquist, H. J.
Poultry Science 32, No. 1, 122 (January, 1953)

A review of all available data indicates that the minimum vitamin A requirement for growth of the chick is approximately 1,000 I.U. per lb. of diet, while that of the poult is approximately 2,300 I.U. per lb. of diet.

5.41 PHARMACEUTICAL ASPECTS OF VITAMIN B_{12}

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Drug & Cosmetic Industry 72, No. 3, 320 (March, 1953)

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Grangaud, Rene; Dieuzeide, Rene; Massonet, Renee; and Douard, Therese
Compt. rend. 235, 213-14 (1952)
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8.50 THE CHEMISTRY OF FISH-SPERM NUCLEI

Felix, F.
Experientia 8, 312-17 (1952)
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8.50 OYSTERS AND CLAMS. BIOCHEMICAL VARIATIONS

Venkataraman, R. and Chari, S. R.
Indian J. Med. Research 39, 533-41 (1951)
Chemical Abstracts 47, No. 1, 230 (1953)

6.135 ATMOSPHERIC POLLUTION

McCabe, Louis C.
Industrial and Engineering Chemistry 45, No. 3, 109A (March, 1953)

Catalytic combustion of odor-producing agents may be applied to all types of gases where oxygen is available.

6.14 INVESTIGATION OF HERRING MEAL QUALITY AFTER DRYING BY DIFFERENT METHODS

Aure, L.; Bakken, K.; and Jebsen, J W.
Reports on Technological Research Concerning Norwegian Fish Industry Vol. II, No. 8, 16 pages (1952) (In Norwegian with English Summary)

(Abstract of this article appears under 6.139 page 5 - May, 1953 issue)

6.15 THE INFLUENCE OF AN UNIDENTIFIED FACTOR FOUND IN FISH SOLUBLES ON HATCHABILITY

Stephenson, E. L. and Clower, B. B.
Poultry Science 31, No. 5, 936 (September, 1952)

(Abstract of this article appears under 6.192 page 11 - May, 1953 issue)

9.4 FAO FISHERIES WORK. PART I

Anonymous
Pan American Fisherman 7, No. 7, 14 (February, 1953)

9.4 HERRING INDUSTRY BOARD. SIXTEENTH ANNUAL REPORT FOR THE YEAR ENDED 31ST MARCH, 1951

Anonymous
Cmd. 8322, 36 pp. (1951)
Food Science Abstracts 25, No. 1, 26 (January, 1953)

9.6 PRODUCTS OF THE SEA AND THE RIVER

Besnard, W.
Book, Paris: Payot, 366 pp. (1948)
Food Science Abstracts 25, No. 1, 27 (January, 1953)

This book deals with the characteristics, collection, and uses of the marine and freshwater products of the world, from the practical, scientific, and commercial aspects. Products included are: fish, crustaceans, whales and seals, reptiles, molluscs, pearls and pearl-shell, sponges, corals, algae, and sea salt. Line drawings show the main types of organism, and chemical and physical data are tabulated.

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